

**WHAT IS CLAIMED IS:**

1. A surface profile measuring instrument for measuring a surface profile of a workpiece, comprising:
  - 5 a probe having a stylus provided with a measuring portion for measuring a surface of a workpiece at a tip end thereof and a detector for outputting a detection signal which varies depending on a measurement condition between the surface of the workpiece and the measuring portion;
  - a scanning mechanism for relatively moving the measuring portion along the
  - 10 surface of the workpiece;
  - a sampling unit that samples position information of the measuring portion when the detection signal reaches a predetermined reference signal value;
  - a response variation factor calculator for calculating a response variation factor that applies variation to a response of the detection signal from the surface of the
  - 15 workpiece; and
  - a profile processor that corrects the position information to obtain an actual profile of the surface of the workpiece using the response variation factor.
2. The surface profile measuring instrument according to claim 1,
  - 20 wherein the response variation factor is a deviation between a measuring point on the surface of the workpiece when the detection signal reaches the reference signal value and a standard measuring point of the measuring portion, and
  - wherein the profile processor includes a correction amount deriving unit that specifies a correction amount of the position information by the response variation factor.
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3. The surface profile measuring instrument according to claim 2, wherein the correction amount deriving unit is a table storing a relationship between the correction amount and the response variation factor.
- 30 4. The surface profile measuring instrument according to claim 2, wherein the correction amount deriving unit is a correction amount calculating formula that calculates the correction amount based on the response variation factor.

5. The surface profile measuring instrument according to claim 2, wherein the deviation is calculated on the basis of a profile vector connecting a first position information of the measuring portion when the detection signal reaches the reference signal value and a second position information of the measuring portion when the detection signal  
5 preceding reached the reference position signal value.
6. The surface profile measuring instrument according to claim 1, wherein the probe is a contact probe having a contact portion as the measuring portion, and  
10 wherein the detector has a vibrator that vibrates the contact portion in one direction and a vibration detector that detects a variation in the vibration of the contact portion.
7. The surface profile measuring instrument according to claim 6, wherein the  
15 response variation factor is an angle formed between the measuring point of the surface of the workpiece when the detection signal reaches the reference signal value and the vibrating direction of the contact portion, and  
wherein the profile processor has a correction amount deriving unit that determines a correction amount based on the response variation factor, the correction  
20 amount being a variation amount of the position information from the time when the contact portion starts touching the surface of the workpiece to the time when the detection signal reaches the reference signal value.
8. The surface profile measuring instrument according to claim 6, wherein the  
25 vibrating direction of the contact portion is aligned with the axial direction of the stylus, and  
wherein the scanning mechanism moves the measuring portion within a plane including the axis of the stylus.
- 30 9. A surface profile measuring method for measuring a surface profile of a workpiece, comprising the steps of:  
providing a probe having a stylus provided with a measuring portion for measuring

a surface of a workpiece at a tip end thereof and a detector for outputting a detection signal which varies depending on a measurement condition between the surface of the workpiece and the measuring portion;

relatively moving the measuring portion along the surface of the workpiece while  
5 scanning;

sampling a position information of the measuring portion when the detection signal reaches a predetermined reference signal value;

calculating a response variation factor that applies variation to the detection signal from the surface of the workpiece when the detection signal reaches the reference signal  
10 value; and

correcting the position information using the response variation factor to obtain an actual profile of the surface of the workpiece.

10. A surface profile measuring instrument for measuring a surface profile of a  
15 workpiece, comprising:

a probe having a stylus provided with a measuring portion for measuring a surface of a workpiece at a tip end thereof and a detector for outputting a detection signal which varies depending on a measurement condition between the surface of the workpiece and the measuring portion;

20 a scanning mechanism for relatively moving the measuring portion along the surface of the workpiece;

a sampling unit that samples position information of the measuring portion when the detection signal reaches a predetermined reference signal value;

25 a response variation factor calculator for calculating a response variation factor that applies variation to a response of the detection signal from the surface of the workpiece; and

a reference position signal value calculator for calculating a reference position signal value indicating the value of the detection signal that indicates that the relative position between the measuring portion and the surface of the workpiece reaches a  
30 reference position.

11. A surface profile measuring instrument for measuring a surface profile of a

workpiece, comprising:

a probe having a stylus provided with a measuring portion for measuring a surface of a workpiece at a tip end thereof and a detector for outputting a detection signal which varies depending on a measurement condition between the surface of the workpiece and the

5 measuring portion;

a scanning mechanism for relatively moving the measuring portion along the surface of the workpiece;

a sampling unit that samples position information of the measuring portion when the detection signal reaches a predetermined reference signal value; and

10 a profile processor that corrects the position information to obtain an actual profile of the surface of the workpiece using the response variation factor, the profile processor determining a measuring point of the workpiece based on a profile vector connecting a first position information of the measuring portion when the detection signal reaches the reference signal value and a second position information of the measuring portion when the  
15 detection signal precedingly reached the reference position signal value.

12. The surface profile measuring instrument according to claim 11, wherein the measuring point is located on a straight line passing the point indicated by the first position information and orthogonal with the profile vector.

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